

REVISION OF *SIPHONANDRA* (ERICACEAE: VACCINIEAE),
A GENUS ENDEMIC TO PERU AND BOLIVIA

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ABSTRACT

The genus *Siphonandra* is revised. Two new species, ***Siphonandra nervosa*** Luteyn & E.M. Ortiz and ***Siphonandra santa-barbarensis*** Luteyn & E.M. Ortiz, are described, illustrated, mapped, and put into the context of a key to the five known species in the genus. An additional two species, *Siphonandra elliptica* and *Siphonandra magnifica*, are lectotypified.

RESUMEN

Se revisa el género *Siphonandra*. Se describen e ilustran dos nuevas especies, ***Siphonandra nervosa*** Luteyn & E.M. Ortiz y ***Siphonandra santa-barbarensis*** Luteyn & E.M. Ortiz. Adicionalmente se incluye una clave para las cinco especies del género y se lectotifican dos especies, *Siphonandra elliptica* y *Siphonandra magnifica*.

INTRODUCTION

Siphonandra is a small, distinctive, high-elevation genus of five species that are endemic to the geographical range from northern Peru (Amazonas) to northern Bolivia (Cochabamba). It was named by Klotzsch (1851) on the basis of its long and slender staminal tubules, but is also characterized by its articulate calyx, usually connate filaments, and perfectly terminal pores at the tips of the tubules (Smith 1932; Luteyn 1998, 2002b). *Siphonandra elliptica*, the type species, spans the entire geographical range of the genus from northern Peru (Amazonas) to northern Bolivia (Cochabamba), where it is common. The other four species, however, are only known from one collection site each, thus making it difficult to assess relationships between any of the species in this genus. The description of *Siphonandra nervosa* and *S. santa-barbarensis* brings to three the number of species found in Peru and to five the number described overall in the genus, which until a few years ago was only known from the widespread *S. elliptica* (see Luteyn 2002a).

Smith (1932) compared *Siphonandra* morphologically with *Lysiclesia* (= *Orthaea*), *Ceratostema*, and *Orthaea* on the basis of their having in common the characters of articulate calyces and anther dehiscence through apical pores, although he believed that these similarities were “doubtless derived by distinct and somewhat parallel courses.” It is true that the genus *Siphonandra* is morphologically most similar to those species of *Ceratostema* that have anther dehiscence by perfectly terminal pores (but there are about as many species in *Ceratostema* that have dehiscence through oblique or lateral pores); both genera have articulate calyces, large corollas, and equal stamens with very slender anther tubules with apical dehiscence. The major differences are that *Ceratostema* has corolla lobes proportionally very long and narrow (usually greater than 4 mm long) and its corolla is also usually basally ventricose, whereas *Siphonandra* has corolla lobes very short (equal to or less than 2 mm long) and its corolla is cylindrical with parallel sides along its entire length. Also the geographical ranges of the two genera do not overlap, with *Ceratostema* ranging from Venezuela to northern Peru (Piura, Cajamarca), north of the Huancabamba Depression, whereas *Siphonandra* ranges from northern Peru (Amazonas), south of the Huancabamba Depression, and into northern Bolivia (south to Cochabamba). *Orthaea* seems more distantly related having alternately unequal stamens.

Morphological and molecular studies clarify that *Siphonandra* is definitely found within the blueberry tribe Vaccinieae (Kron et al. 2002a). The only published molecular phylogeny of Vaccinieae that included *Siphonandra* (Kron et al. 2002b) used *matK* and ITS data, which placed *Siphonandra* within an “Andean clade” sister to a polytomous group containing *Sphyrospermum*, *Disterigma*, and one species of *Ceratostema*.

A subsequent study within the "Andean clade" did not include *Siphonandra* (Powell & Kron 2003). Therefore, the overall data that was based on only one sequence from one species of *Siphonandra* seems premature and there is still uncertainty about its affinities.

KEY TO THE SPECIES OF *SIPHONANDRA*

1. Filaments distinct.
 2. Rachis to 0.5 cm long, 3–6-flowered; calyx ca. 9 mm long, the tube densely bearing squamiform, carnosose warts; corolla 35–37 mm long _____ **3. *Siphonandra magnifica***
 2. Rachis 12–25 mm long, 10–22-flowered; calyx 6–10 mm long, the tube without warts; corolla 18–26 mm long _____ **5. *Siphonandra santa-barbarensis***
1. Filaments connate.
 3. Corolla 43–48 mm long _____ **1. *Siphonandra boliviana***
 3. Corolla ca. 25 mm long.
 4. Leaf blades lanceolate, (3.5–)5.5–8.5 × (1–)1.5–3 cm, apically shortly and bluntly acuminate, marginally entire, the lateral nerves 6–8 per side; inflorescences 3–4-flowered, the rachis to 0.7 cm long; pedicels to 7 mm long _____ **4. *Siphonandra nervosa***
 4. Leaves oblong, ovate-oblong, or slightly obovate, 3–5.5 × 1–2.5 cm, apically obtuse or subacute, marginally entire or faintly crenulate, the lateral nerves 3–5 per side; inflorescences 5–15-flowered, the rachis striate, 1.5–5 cm long; pedicels 7–20 mm long _____ **2. *Siphonandra elliptica***

TAXONOMY

Siphonandra Klotzsch, *Linnaea* 24:24. 1851. *Ceratostema* Juss. sect. *Siphonandra* (Klotzsch) Hook. f. ex Benth. & Hook. f., *Gen. Pl.* 2:570 p.p. 1876. TYPE SPECIES: *Siphonandra elliptica* (Ruiz & Pav. ex G. Don) Klotzsch.

Siphonostema Griseb. in Lechl. *Berb. Amer. Austr.* 58. 1857, nom. nud. TYPE SPECIES: *Siphonostema myrtifolium* Griseb.

Terrestrial or often epiphytic **shrubs**. **Leaves** alternate, with blades coriaceous, evergreen, marginally recurved and entire or faintly crenulate; pinnately nerved, short-petiolate; axillary bud scales 2, valvate. **Inflorescences** axillary, solitary, racemose, with 5–22 pedicellate flowers; floral bract inconspicuous; bracteoles 2. **Flowers** (4–)5-merous, without odor; aestivation valvate; calyx articulate with pedicel, the tube short-cylindric, terete to narrowly winged, the limb spreading, the lobes 5; corolla cylindric; **stamens** 10, equal, often slightly longer than corolla, the filaments distinct to connate, equal, shorter than anthers, the anthers basifixed, lacking spurs, lacking disintegration tissue, the thecae granular, the tubules distinct to base, elongate, slender, flexible, about half as wide (or less) as thecae, 4–5 times longer than thecae, dehiscing by strictly terminal, slightly flaring pores; pollen without viscin threads; ovary inferior; style filiform, slightly exerted; nectariferous disc annular. **Fruit** a spherical berry.

The current generic concept follows that of Klotzsch (1851) and Smith (1932), but differs by the acceptance of species with distinct staminal filaments (vs. connate in original concept) as first noted by Sleumer (1941).

1. *Siphonandra boliviana* Luteyn, *Sida* 20:13–15. 2002. (**Fig. 1**). TYPE. BOLIVIA. LA PAZ: Prov. Bautista Saavedra: Charazani, W of Chullina, 3400 m, 1 Aug 1994 (fl), B. Herzog H200 (HOLOTYPE: NY; ISOTYPES: LPB, n.v., LZ, n.v.).

Shrubs (size unknown); mature branches terete, glabrous, the bark exfoliating in thin strips; immature branches subterete, sometimes shallowly angled or ribbed, short-pilose with white hairs; axillary bud scales ca. 2 mm long, short-pilose. **Leaves** with blades coriaceous, elliptic to oblanceolate, 2.5–5.5 × 1–1.8 cm, basally cuneate, apically broadly acute to nearly obtuse, marginally entire, the lamina essentially glabrous above or sparsely short-pilose proximally along midrib, sparsely pilose beneath especially along midrib, also provided with reddish-brown, basally swollen, glandular fimbriae beneath; pinnately nerved with 4–6 secondary veins anastomosing near margin, the midrib and secondary veins impressed above and raised beneath, the reticulate veinlets plane to slightly impressed above but inconspicuously raised beneath; petioles rugose, subterete, broadly flattened above, 4–5 mm long. **Inflorescences** ca. 20-flowered, apparently nodding; rachis subterete, striate to angled, at least 5 cm long (still in bud, apparently still elongating), densely short-pilose with white hairs; floral bract ovate, acuminate, 3–4 mm long, densely short-pilose; pedicels subterete, striate to angled, 11–13 mm long, densely short-pilose as rachis; bracteoles located in proximal

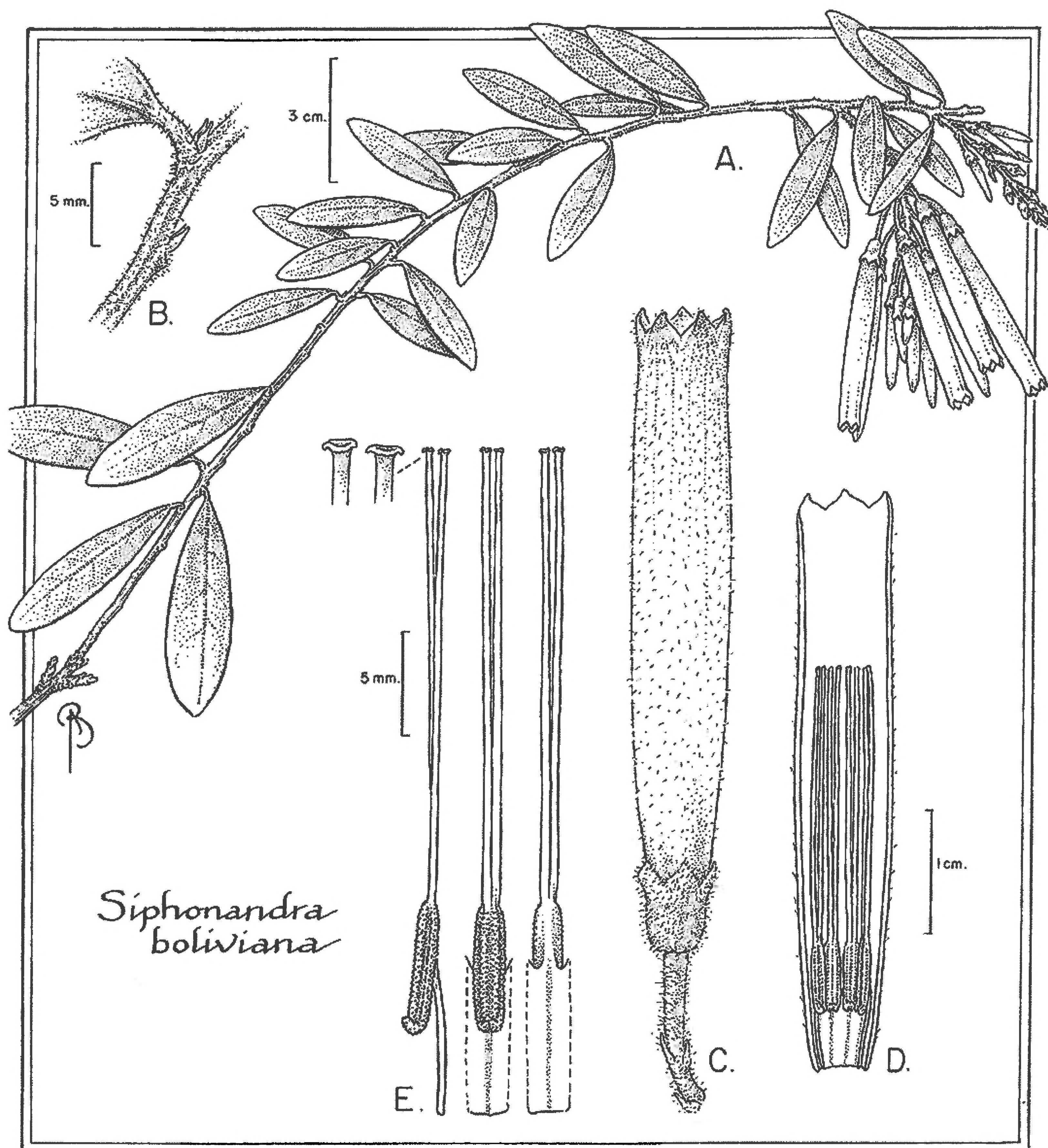


FIG. 1. *Siphonandra boliviana* Luteyn. A. Habit. B. Portion of stem showing pubescence, leaf attachment, and axillary bud scales. C. Flower showing floral bract, pedicel, bracteoles, calyx, and corolla. D. Longitudinal section of corolla showing position of stamens. E. Stamens showing lateral, ventral, and dorsal views with details of terminal dehiscence pores. (Drawn from type collection).

1/3 pedicel, similar to floral bract, 2–3 mm long. **Flowers** with calyx 7–8 mm long, densely short-pilose as rachis, the tube cylindrical, ribbed, 4–5 mm long, rounded at base, the limb spreading-campanulate, 3.8–4.5 mm long, the lobes deltate, acute, 1.5–2 mm long; sinuses obtuse; corolla long-cylindrical, 43–48 mm long, 6–7 mm diam., short-pilose throughout with white hairs, the lobes deltate, acute, ca. 2 mm long; **stamens** ca. 32 mm long, the filaments connate, ca. 7 mm long, glabrous, the anthers ca. 28 mm long, the thecae granular, ca. 6 mm long, incurved at base, the tubules ca. 22 mm long; style about equaling corolla. **Berry** not seen.

Icones.—see Luteyn 1998, 2002 (Fig. 1).

Distribution (Fig. 2).—Endemic to Bolivia (La Paz) and known only from the type collection, which was made in a *Weinmannia* forest at 3000–3500 m. Rare and endangered.

Siphonandra boliviana is easily distinguished morphologically from the other two species by the characters mentioned in the key and diagnosis.

2. *Siphonandra elliptica* (Ruiz & Pav. ex G. Don) Klotzsch, *Linnaea* 24:24. 1851 (**Fig. 3**). *Thibaudia elliptica* Ruiz & Pav., *Fl. Peruv. Chil.* 4: pl. 384, fig. b. 1802, nom. nud. *Thibaudia elliptica* Ruiz & Pav. ex G. Don, *Gen. Hist.* 3: 861. 1834. *Ceratostema ellipticum* (Ruiz & Pav.) Benth. & Hook. f., *Gen. Pl.* 2: 570. 1876. *Eurygania elliptica* (Ruiz & Pav.) Britton, *Bull. Torrey Bot. Club* 20:137. 1893. TYPE. PERU. Muña, Pillao and Acomayo, Ruiz & Pavón s.n. [lectotype, here designated by Luteyn: MA! (numbered “15/50” and barcoded MA747445; photo F neg. 29347)]. I suspect that G. Don validated the name in *Thibaudia* based simply on the plant illustrated by Ruiz and Pavón, and not on an actual specimen he saw. Illustrations: Hooker. *Icones pl.* 2: t. 108. 1837. The Hooker illustration is based on “Cuesta of Huanacabra, Andes of Peru. Mathews. (n. 884)” which is at K (1 full sheet and another 1/2 sheet), probably BM, CGE, and OXF also. See also Luteyn 1998. [There is a “884” numbered collection without collector or locality at BM, which also has the hand-written name “*Ceratostema corymbosa*” written on its label; at OXF too. We do not know of any citation anywhere of the name “*C. corymbosa*,” which must be unpublished.] (Fig. 3).

Siphonostema myrtifolium Grisebach in Lechl., *Berb. Amer. Austr.* 58. 1857, nom. nud. TYPE collection cited: *Lechler* 2276 (K!). The K sheet is not formally marked as type except by annotation label of ACS in 1931. The sheet at G was annotated as *S. elliptica* by ACS in 1932.

Siphonostema costatum Grisebach in Lechl., *Berb. Amer. Austr.* 58. 1857, nom. nud. TYPE collection cited *Lechler* 2053 (K!). The K sheet is not formally marked as type except by annotation label of ACS in 1931. The sheet at G was annotated as *S. pilosa* by ACS in 1932.

Ceratostema hookeri Britton, *Bull. Torrey Bot. Club* 20:137. 1893, nom. illeg. Britton based this new name on the *Thibaudia elliptica* illustration in W.J. Hooker's, *Icon. Pl.* t. 108 (1837), non Ruiz & Pavón (1802). I think Britton created this unnecessary name when he noted the difference in illustrations between Ruiz and Pavón's plant and that of Hooker (just as I do). Although the descriptions seem to match, the plant illustrated by Ruiz and Pavón (1802) and that of the lectotype itself at MA show leaves that are nearly plinerved with 3–5 nerves per side; whereas, the illustration of Hooker (1837) shows a plant with definitely pinnately nerved leaves. Britton cited *Rusby* 2036 (NY) from Mapiri, Bolivia, as an example of his new species.

Ceratostema weberbauerii Hoerold, *Bot. Jahrb. Syst.* 42: 316. 1909. TYPE. PERU. PUNO: Sandia, 3100–3300 m, Apr 1902 (fl), *Weberbauer* 740 (HOLOTYPE: B, destroyed).

Siphonandra pilosa A. C. Smith, *Contrib. U.S. Natl. Herb.* 28(2):355. 1932. *Ceratostema pilosum* (A.C. Smith) J. F. Macbride, *Univ. Wyoming Publ.* 11: 42: 1944. TYPE. BOLIVIA. LA PAZ: Larecaja: Cerro de Tuile, vic. Tacacoma, 3350 m, May or June 1860, *Mandon* 549 [HOLOTYPE: NY; ISOTYPES: G(4x; photo F neg. 26655), K-Herb. Hook., P(3x)].

Terrestrial or epiphytic **shrubs** to 2 m tall; mature stems terete, glabrous, the bark cracking in thin, longitudinal strips yellowish to light brown in color; immature stems subterete, striate, puberulous when young, glabrate or persistent; axillary bud scales 2, valvate, ovate, acuminate to apiculate, striate, ca. 3–4 mm long, not pseudo-stipular. **Leaves** with blades thick-coriaceous, oblong, ovate-oblong, or slightly obovate, 3–5.5 × 1–2.5 cm, basally cuneate, apically obtuse or subacute, marginally entire or faintly crenulate, slightly revolute, the lamina glabrous or sparsely brownish-pilose above, pilose to sparsely pilose beneath with scattered, appressed, dark brown hairs ca. 0.4–0.5 mm long, glabrate, often strongly punctuate on both surfaces from deciduous glandular fimbriae; pinnately nerved, the midrib impressed above, prominent beneath, the secondary nerves 3–5 per side, spreading, ascending at margin, slightly impressed above, plane to raised beneath, the reticulate veinlets copious, sometimes obscure, plane; petioles subterete, rugose, 3–5 mm long, puberulous or glabrous. **Inflorescences** 5–15-flowered, deciduously bracteate at base with several, ovate bracts ca. 1.5–2 mm long; rachis striate, 1.5–5 cm long, glabrous or pilose with copious, pale, spreading hairs to 0.3 mm long; floral bract deciduous, ovate, acuminate, ciliate with white hairs to 1 mm long, the lamina glabrous, ca. 3.5–4 mm long; pedicels rugose, 7–20 mm long, pilose or glabrous, bearing several minute, cartilaginous teeth at apex; bracteoles basal, ovate, acuminate, ca. 1.5–3 mm long, ciliate. **Flowers** with calyx ca. 7–8 mm long, the tube cylindric, sometimes 5–10-ribbed, ca. 3–3.5 mm long, glabrous to pilose with short, pale, spreading hairs, the limb 3.5–4.5 mm long, the lobes to ca. 1.5–3 mm long; sinuses broadly rounded; corolla cylindric, 20–26 mm long, 4–5 mm diam., glabrous to sparsely pilose, red with whitish or pale greenish tips when fresh, the lobes triangular, obtuse to subacute, ca. 1–1.5 mm long; **stamens** ca. 25 mm long, the filaments connate (supposedly rarely distinct in type of *S. weberbauerii*), ca. 5–6 mm long,

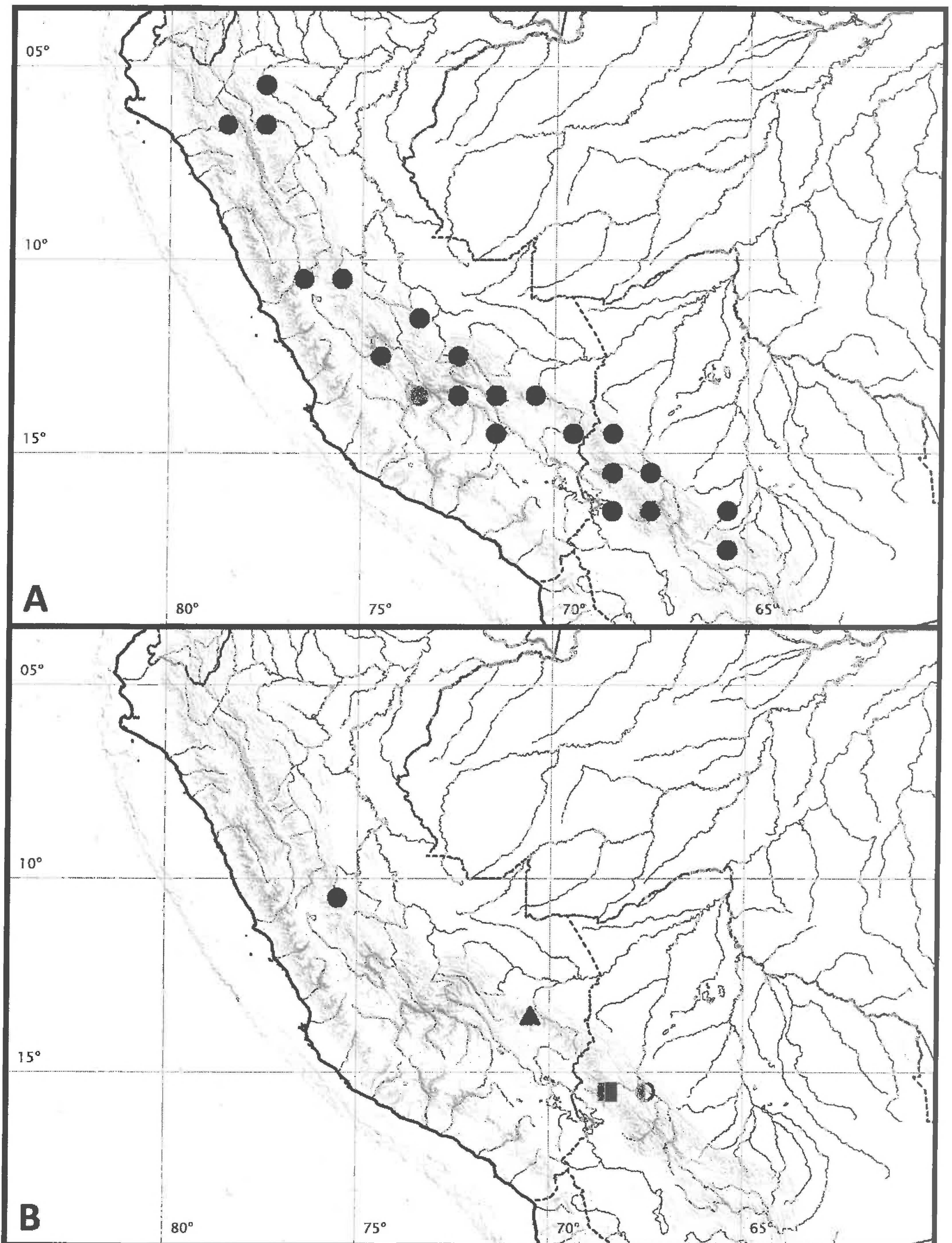


Fig. 2. Distribution of species of *Siphonandra*. A. ● *S. elliptica*. B. ● *S. santa-barbarensis*; ▲ *S. nervosa*; ■ *S. boliviana*; ◐ *S. magnifica*.

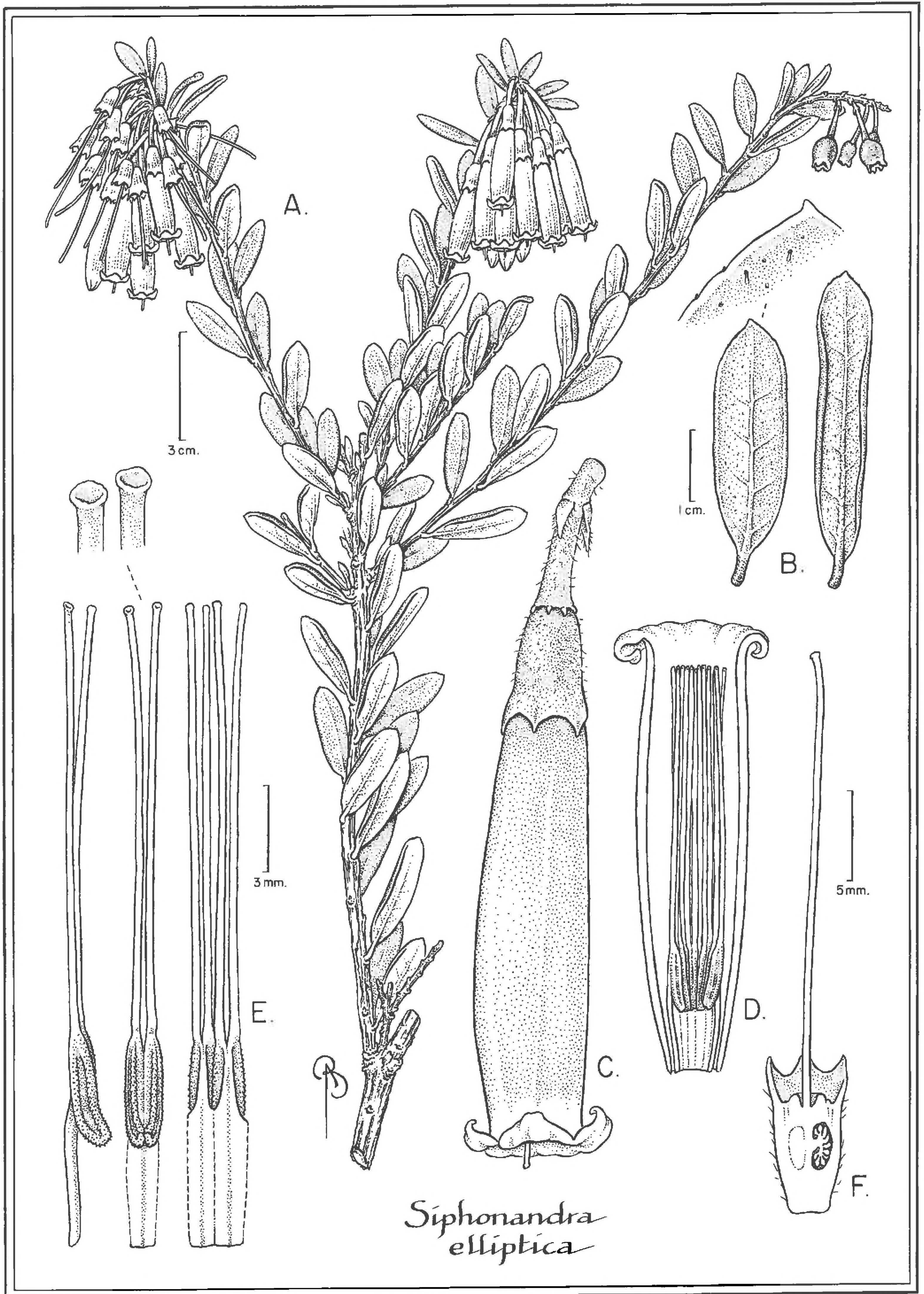


FIG. 3. *Siphonandra elliptica* (Ruiz & Pav. ex G. Don) Klotzsch. A. Habit. B. Leaf variation showing lower surfaces with details of apical portion. C. Flower showing pedicel, bracteoles, calyx, and corolla. D. Longitudinal section of corolla showing position of stamens. E. Stamens showing lateral, ventral, and dorsal views with details of terminal dehiscence pores. F. Longitudinal section of calyx. (A, B-left leaf drawn from Luteyn et al. 15431; B-right leaf from Luteyn & Lebrón-Luteyn 6396; C-F from Luteyn et al. 15456).

glabrous, the thecae incurved and sometimes setose at base, ca. 4–5 mm long, the tubules 13–18 mm long, less than 0.4 mm diam; style about as long as corolla or slightly exerted, the stigma peltate. **Berry** cylindrical to elliptic-ovoid, glabrous to sparsely pilose, to 10–12 mm long, the calyx limb decurrent.

Distribution (Fig. 2).—Common from Peru (Dpts. Amazonas, Apurímac, Cusco, Pasco, Puno) into Bolivia (Dpt. Cochabamba: Prov. Chapare and Dpt. La Paz: Provs. Bautista Saavedra, Franz Tamayo, Inquisivi, Larecaja, Murillo, Nor Yungas, Sud Yungas). Found growing in montane cloud forest, shrub vegetation on sandstone, wet puna, bosque siempreverde, bosque húmedo montano de las yungas, ceja de montaña, at elevations of 2200–4000 m. Flowering in Feb, Mar, Apr, May, Jun, Jul, Sep, Oct, Dec; fruiting in Jun, Dec. Common to abundant.

Representative specimens examined: **PERU. Amazonas:** Chachapoyas, Weigend et al. 2000/876 (F, NY); Luya et al. 8843 (USM); near Molinopampa, van der Werff et al. 14894 (MO); Laguna de Pomacochas, van der Werff et al. 15822 (MO). **Apurímac:** Pinkos river, Weberbauer 5861 (F). **Cusco:** Cosñipata, Weberbauer 6929 (B+, F, US); Cerro de Cusilluyoc, Pennell 13857 (F, NY, US); La Convención, Dudley 11124 (USM); Huamantupa & Huamantupa 4440 (CUZ, MO); Paucartambo, Cano 3117 (USM); Croat 78186 (MO); Soukup 383 (F); Accanaco, West 7047; Balls 6704 (BM, K, NY, US), 6705; Cano 3117 (USM), 3174 (USM), 3660 (USM), 4520 (USM); Cano & Aguilar 5157 (USM, F); Cano & Baldeón 4967 (USM); Huapalla 136 (USM), 211 (USM); Luteyn & Lebrón-Luteyn 6396 (F, MO, NY, USM); Plowman & Davis 5124 (USM); Tupayachi 30 (MO); Challabamba, Cano 4339 (USM); Lluntuyoc, Woytkowski 560 (MOL, USM); Cedrobamba, Heller 2190 (US); Urubamba, Metcalf 30749; C. Vargas 3422, 4295 (both US); F. L. Herrera 3339 (US); Hoogte & Roersch 1397 (NY); Keel & Oqueso 439 (AAU, NY); Funk et al. 3444 (NY, US); N. Salinas et al. 7620 (CUZ, NY); Pedraza et al. 1541 (CUZ, NY, USM); Gentry et al. 23475 (MO, NY); Luteyn & Lebrón-Luteyn 6377, 6450, 6464 (all at NY, USM); B. León & Aguilar 2333 (NY, USM); R. Foster & Wachter 7545 (CUZ, F, NY, USM); Nuñez 7780 (NY, USM); Nuñez et al. 8520 (NY, USM). **Junín/Cuzco border:** Satipo/La Convención border, Boyle et al. 4133 (F, USM), 4138 (F, USM). **Pasco:** Oxapampa, E. Ortiz 225 (HOXA, MO, USM), 802 (HUSA, USM); D. N. Smith 2441 (MO), 2516 (MO), 8082 (USM, MO). **Puno:** San Gaván, Lechler 2276 (K); Tabina, Lechler 2053 (*S. pilosa* form) (K); Sandia, Soukup 223; Mathews 884 (BM, K).

BOLIVIA. Eastern Andes, Pearce 790 (K). **Cochabamba:** Chapare, Aguilar & Muriel 1226 (LPB, BOLV); Atahuachi 876 (BOLV); Cárdenas 60 (BOLV, US); Bang 2003 (NY); J. Steinbach 9529 (BM, G, K, NY, US); R. Steinbach 646 (US). **La Paz:** Mapiri, Rusby 2219 (NY), 2036 (B+, BM, F, G, K, NY, US); Yungas, Rusby 2034; Bautista Saavedra, Gutte 458 (LPB); Copunco, Tate 371 (NY); Franz Tamayo, Maldonado et al. 3210 (LPB); Inquisivi, Lara 236 (LPB); Lewis 38496 (LPB, MO, NY), 39358 (LPB, MO, NY), 39421 (LPB, MO), 39719 (LPB, MO), 40940 (LPB, MO); Larecaja, Krukoff 11466 (F, NY); Clark 6642 (LPB); Beck & Ruthsatz 21472 (LPB); between Okara and Ancoma, Tate 862 (NY); Luteyn & Dorr 13584 (AAU, BOLV, LPB, NY); Luteyn et al. 15456 (AAU, BOLV, CAS, CTES, E, LPB, NY, QCNE, TEX); Gutte & Herzog G458 (LPB); Pizarro E. 28 (LPB); Lara D. et al. 236 (LPB); Clark 6642 (LPB); Maldonado et al. 3210 (LPB); Lewis 39719 (LPB); Solomon & Moraes 11424 (K); Nor Yungas, Beck 21472 (LPB); Luteyn et al. 15477 (LPB, NY); Solomon & Moraes 11424 (LPB, F, MO, NY); Sud Yungas, Luna-Pizarro 28 (LPB). **Murillo:** Beck 21551 (LPB); Luteyn & Dorr 13584 (LPB, BOLV, NY), Luteyn et al. 15431 (LPB, NY); Solomon 5230 (MO, NY). **Unknown locality:** Pearce s.n. (March 1866) (BM); C. Troll 1643, 2592 (both B, n.v.). Tablas, 3400 m, Herzog 2188 (G).

Local name and uses.—willuntuy. Fruits edible, sweet.

Siphonandra elliptica and *S. pilosa* were distinguished only by pubescence persistence of the pedicels and calyces, characters which we do not consider as stable.

3. *Siphonandra magnifica* Sleumer, Notizbl. Bot. Gart. Berlin-Dahlem 12(112):132–133. 1934. TYPE. BOLIVIA.

LA PAZ: Nor Yungas, San Lorenzo-Tola, forest between Tola and San José, 3000 m, 28 Jun 1926 (fl), C. Troll 2593 [HOLOTYPE: B, destroyed; LECTOTYPE, here designated: US frag. ex B holotype (barcode US00113579)].

Tall **shrubs**; mature stems thick; immature stems angled, glabrous. **Leaves** with blades thick-coriaceous, oblong-ovate, basally narrowed, apically rounded, marginally strongly recurved, obscurely and minutely denticulate or entire, the lamina glabrous; pinnately nerved (?), the midrib strongly impressed above and raised beneath, lateral nerves 4–5, arcuate-ascending, joined at margin, impressed above and often raised beneath; petioles thick, 5 mm long. **Inflorescences** 3–6-flowered; rachis short, hardly 5 mm long, or almost none; floral bract unknown; pedicels thick, glabrous; bracteoles basal, ovate-deltate, acute, ca. 3 mm long. **Flowers** with calyx campanulate, ca. 9 mm long, glabrous, the tube densely bearing squamiform, carnosé warts, the limb erect-spreading, the lobes broadly deltate, acute, ca. 1.5 mm long; corolla cylindrical, thick-carnosé, 3.5–3.7 cm long, 7–8(–9) mm diam., glabrous, the lobes triangular, ca. 2 mm long, reflexed; **stamens** slightly shorter than corolla, ca. 3 cm long, the filaments distinct, often puberulent, ca. 6 mm long, the anthers ca. 2.6 cm long, the thecae subpapillose; style thick, glabrous, ca. 3.5 cm long. **Berry** not seen.

Distribution (Fig. 2).—Endemic to Bolivia (La Paz) and known only from the type. Rare and endangered.

Siphonandra magnifica is herewith maintained despite the fact that the type and only specimen was destroyed during World War II. Sleumer (1934: 133) mentioned that it “surpasses both species as yet known [*S. elliptica* and *S. pilosa*] in all dimensions”, but differed from *S. elliptica* by the very short, often indistinct rachis, the very large corolla, the hairy filaments, and the calyx which was covered with fleshy squamules.

NEW SPECIES

4. *Siphonandra nervosa* Luteyn & E.M. Ortiz, sp. nov. (**Fig. 4**). TYPE. PERU. PUNO: Carabaya, Dtto. Ayapata, near Campamento Chacayage, 13°45.8'S, 70°13.11'W, ca. 2600 m, 10 Mar 2004 (fl), S. Vilca C., K. Arce C., C. Dávalos M, & E. Ortiz V. 62 (HOLOTYPE: HUSA; ISOTYPES: HAO, NY).

A *Siphonandra elliptica* foliis lanceolatis (non oblongis vel obovatis), majoribus, 3.5–8.5 cm longis (non 3–5.5 cm), apicibus foliorum breviter obtuseque acuminatis (non obtusis vel subacutis), nervis lateralibus prominentibus per laterem 6–8 (non 3–5), inflorescentiis pauci-floris, 3–4-floris (non 5–15-floris), rhachidibus brevioribus, usque 0.7 cm longis (non 1.5–5 cm), pedicellis brevioribus, usque 7 mm longis (non 7–20 mm) differt.

Lianoid, epiphytic **shrubs** with branches to 10 m long; mature stems terete to subterete, ribbed to bluntly angled, short-pilose with white hairs 0.2–0.3 mm long, the bark exfoliating in thin strips; immature stems subterete to bluntly complanate, striate, moderately short-pilose as mature stems; axillary bud scales narrowly ovate, long-acuminate, pseudostipular, ca. 3 mm long, short-pilose to glabrate. **Leaves** with blades coriaceous, lanceolate to elliptic-lanceolate, (3.5–)5.5–9.5 × (1–)1.5–3 cm, basally broadly cuneate, apically short-acuminate, the apex itself blunt, marginally entire, the lamina sparsely short-pilose and ciliate near base otherwise glabrate above, persistently moderately short-pilose along midrib beneath; pinnately nerved with 8–10 secondary veins per side anastomosing near margin, the midrib strongly impressed above and prominently raised beneath, the secondary nerves slightly impressed above and raised beneath causing leaves to appear slightly bullate, the reticulate veinlets obscure on both surfaces; petioles rugose, subterete, canaliculate above, 3–8 mm long, short-pilose. **Inflorescences** to 5-flowered; rachis sharply angled, ca. 3–5 mm long, sparsely short-white-pilose as stems, circumscribed at base by numerous, ovate, apiculate, ciliate bracts to ca. 2.5 mm long; floral bract ovate, acute, ca. 2.5 mm long, ciliate, marginally also with few glandular fimbriae; pedicels striate to sharply angled, 8–11 mm long, densely short-pilose in bud, glabrate; bracteoles located medially, opposite to subopposite, ovate, long-acuminate, ca. 2–3.5 mm long, marginally glandular-fimbriate, ciliate. **Flowers** with calyx 7–9 mm long, moderately to densely short-pilose, the tube cylindrical, terete, 4.5–6.5 mm long, the limb campanulate, 2–4 mm long, the lobes deltate, short-apiculate, ca. 1.5–2 mm long; sinuses broadly rounded; corolla carnose (when fresh), cylindrical, conspicuously 5-angled (when fresh), 22–26 mm long, ca. 5–6 mm diam., glabrous, red (when fresh), the lobes erect, deltate, acute, 1.7–2 mm long, yellow to greenish-yellow (when fresh); **stamens** nearly equaling corolla, 20–21 mm long, the filaments connate, 4–4.5 mm long, glabrous, the anthers 17–18 mm long, the thecae 4.8–5 mm long, strongly papillose, the tubules 12.5–13.5 mm long, the pores 0.2 mm diam.; style slightly exerted, glabrous. **Berry** not seen.

Distribution (Fig. 2).—Endemic to southern Peru (Puno) and known only from the type, collected in heavily-disturbed, mature montane forest along a river margin, at ca. 2600 m elevation. Endangered due to its proximity to gold mining and road building activities.

Siphonandra nervosa is characterized by its comparatively large, lanceolate leaf blades with prominent brochidodromous venation, few-flowered inflorescences, short rachis, pedicels and corolla, and connate staminal filaments. When fresh the corolla is 5-angled and red with yellowish lobes. Morphologically it is most similar to *S. elliptica*, differing primarily in the characters mentioned in the key.

5. *Siphonandra santa-barbarensis* Luteyn & E.M. Ortiz, sp. nov. (**Fig. 5**). TYPE. PERU. PASCO: Oxapampa, Dtto. Huancabamba, Sector Sta. Bárbara, Parque Nacional Yanachaga-Chemillén, source of the Quebrada Cueva Blanca, 10°21'23"S, 75°39'20"W, 3420–3510 m, 16 Aug 2005 (fl), E. Ortiz V., S. Vilca C., C. Arias C., S. Shuña S. & H. Cristóbal E. 807 (HOLOTYPE: HUSA; ISOTYPES: HOXA, MO, NY, USM).

A *Siphonandra magnifica* rhachidibus longioribus, 12–25 mm longis (non usque 5 mm), tubo calycis protuberantibus verrucatis carente, corolla breviori, 18–26 mm longa (non 35–37 mm) differt.

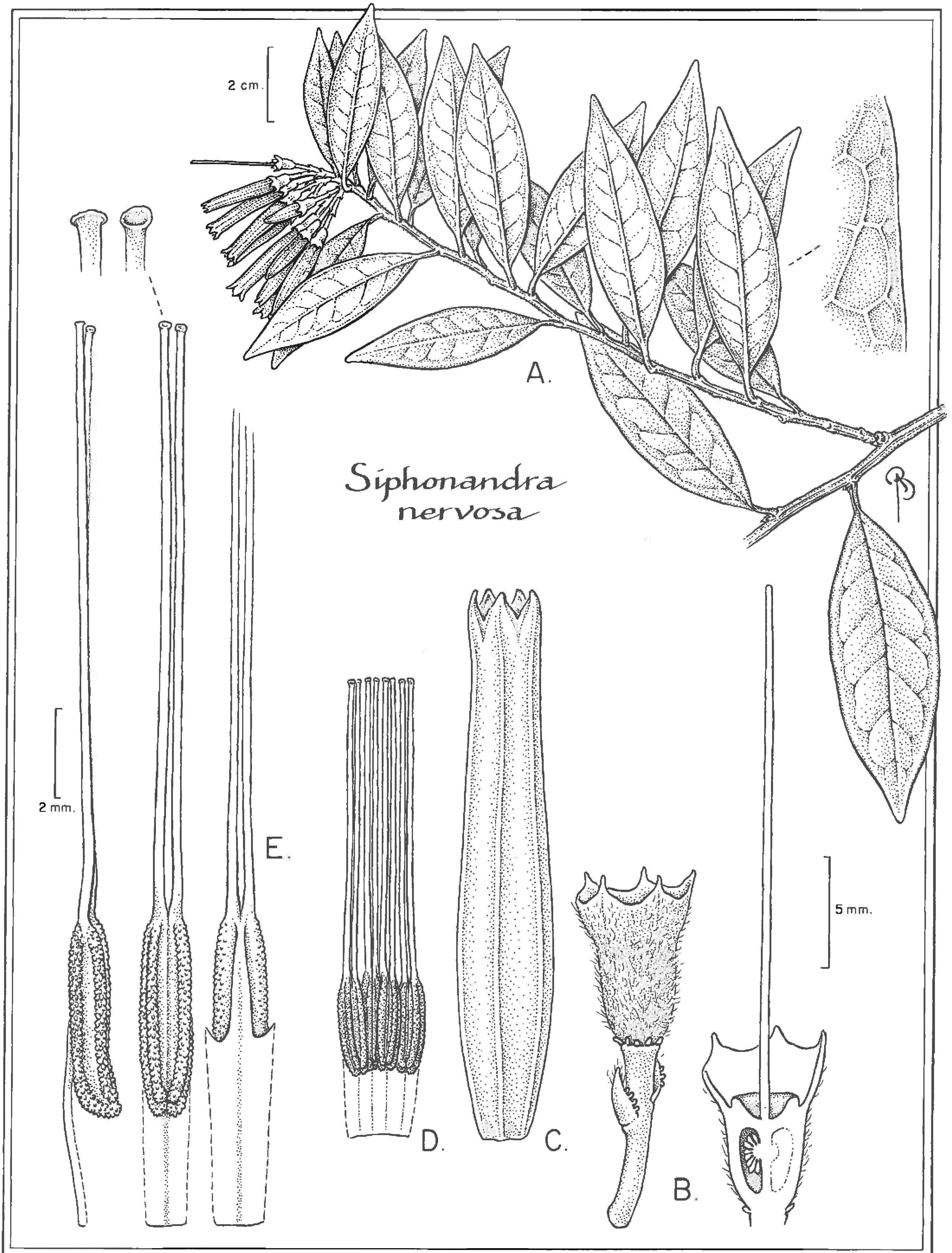


FIG. 4. *Siphonandra nervosa* Luteyn & E.M. Ortiz. A. Habit with details of leaf venation and margin beneath. B. Flower showing pedicel, bracteoles, and calyx (left) and longitudinal section of calyx (right). C. Corolla showing ribs. D. Stamens (4) showing connation of filaments and position with regards to corolla (C). E. Stamens showing lateral, ventral, and dorsal views with details of terminal dehiscence pores. (Drawn from type collection).

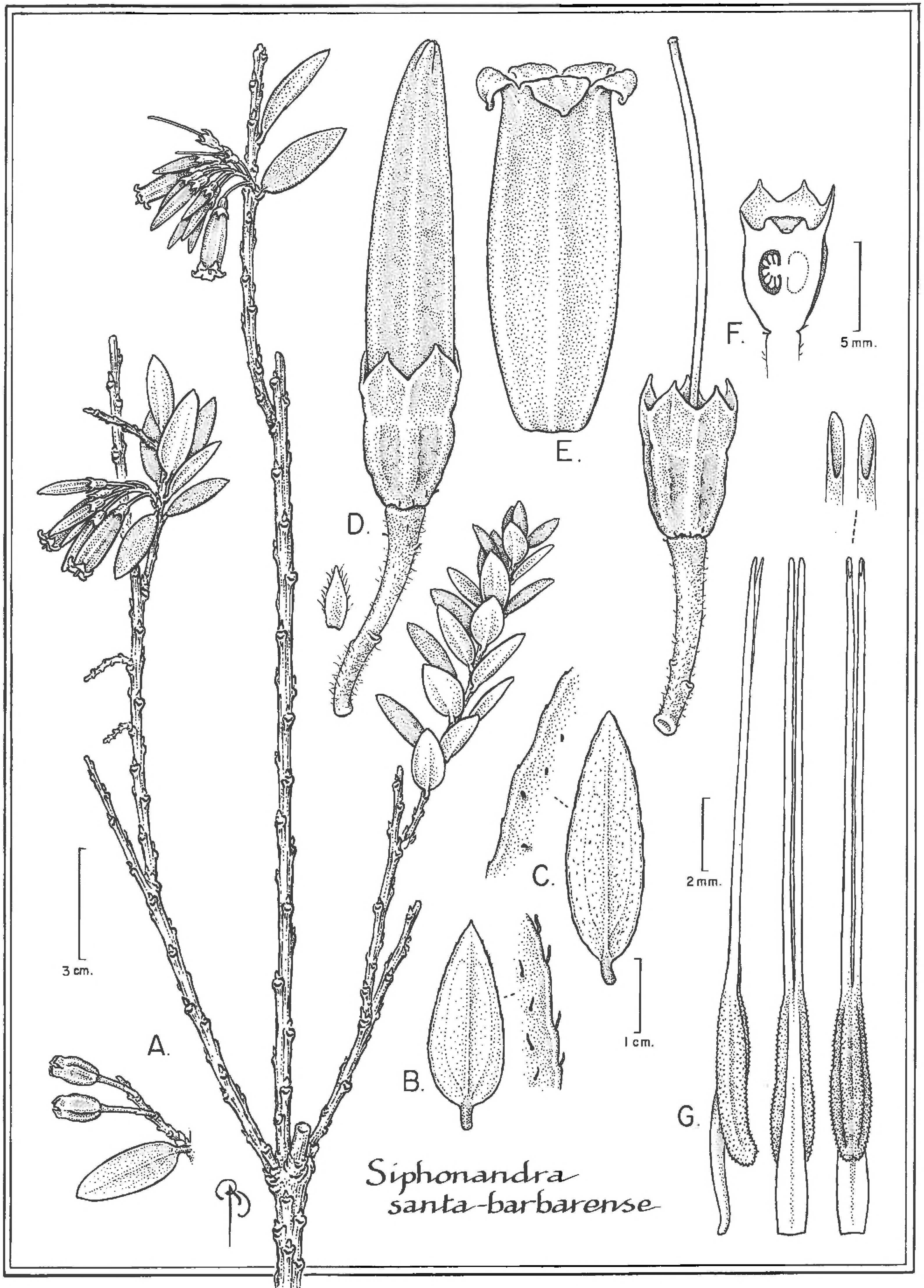


FIG. 5. *Siphonandra santa-barbarensis* Luteyn & E.M. Ortiz. A. Habit showing details of immature fruits and one leaf. B–C. Leaf variation showing lower surfaces with glandular-fimbriate hairs and margins. D. Flower showing pedicel, detached bracteole, calyx, and immature corolla. E. Corolla at maturity. F. Flower showing pedicel, calyx, and style with detailed longitudinal section of calyx. G. Stamens showing lateral, dorsal, and ventral views with details of obliquely terminal dehiscence pores. (A, D–G drawn from Pedraza et al. 1600; B from Ortiz et al. 807; C from Luteyn et al. 15659).

Terrestrial or epiphytic **shrubs** to 4 m tall; mature branches terete to subterete, glabrous, the bark separating into thin, longitudinal strips, not exfoliating; vegetative bracts (at base of new twigs) membranous, suborbicular, 3–5 × 2.5–6 mm, basally articulate, truncate, short-acuminate, fimbriate, glabrous; immature branches subterete to ribbed, glabrous to moderately puberulent, the nodes swollen; axillary bud scales 2, valvate, coriaceous, ovate, 1.5–5 × ca. 0.7–1.5 mm, apparently basally continuous thus persistent, long-acuminate, pseudostipular, ciliate to glandular-fimbriate, glabrous. **Leaves** with blades rigidly coriaceous, ovate-oblong, ovate to lanceolate, 2–4 × (1–)1.2–1.8 cm, basally rounded to short-attenuate, apically acute to subacute, sometimes shortly acuminate, also sometimes sharply mucronate, marginally crenate, plane, glabrous above, glandular fimbriate beneath with hairs ca. 0.4 mm long; obscurely 3(–5)-plinerved, the midrib impressed above and raised beneath, more prominent in the proximal 1/3 of the lamina, the lateral nerves slightly impressed above and obscure beneath, the reticulate veinlets slightly impressed above; petioles subterete, slightly flattened dorso-ventrally, rugose, 3–5 mm long, 1–2 mm diam., glabrous to moderately puberulent. **Inflorescences** racemose to subcorymbose, 10–22-flowered; inflorescence bracts membranaceous, ovate, 3 × 2–2.5 mm, basally articulate, apically rounded, entire, glabrous; rachis subterete to ribbed, 12–25 mm long, ca. 2 mm diam., puberulent; floral bract membranaceous, oblong, 5 × 1.5 mm, basally articulate, apically obtuse to rounded, entire, glabrous; pedicels terete, 10–17 mm long, ca. 1 mm diam., puberulent, also with few, scattered, glandular fimbriae distally; bracteoles caducous to persistent, located in proximal 1/3–1/2 of the pedicel, membranaceous, lanceolate, 4 × 1.5 mm, basally articulate, apically acuminate, ciliate to marginally glandular-fimbriate, glabrous. **Flowers** slightly zygomorphic; calyx 6–10 mm long, glabrescent, pink when fresh, sometimes obscurely articulate with pedicel, the tube obconic, 5-ribbed (broadly when fresh), 3.5–6 mm long, ca. 4 mm diam., the limb campanulate, ca. 3–4 mm long, glabrous, the lobes deltate, apiculate to acuminate, 1.2–2.5 mm long; sinuses rounded to subacute; corolla tubular, pentagonal, slightly broadest in the middle, carnose especially along the angles, 18–26 mm long, 6–8.5 mm diam., glabrous, rose-red, the lobes erect to reflexed, deltate, acute to subacute, 2–3.5 mm long, glabrous, externally rose-red, internally whitish; **stamens** 10–20 mm long, the filaments distinct, 3–4 mm long, glabrous, the anthers ca. 17–18 mm long, the thecae tubular with the base shortly incurved and tapering into the tubules distally, 5–6 mm long, slightly papillose, the tubules distinct, 11–13 mm long, dehiscing by an oval, subterminal pore 0.5–1 mm long; nectariferous disc pulvinate, glabrous; style 20–24 mm long, the stigma punctiform. **Berry** immature, obconic, 5-ribbed, 10 mm long, 6 mm diam., glabrous, greenish-red.

Distribution (Fig. 2).—Endemic to the upper limit of montane cloud forest, in elfin forest patches in sheltered areas, alternating with puna grasslands, at elevations of 3400–3600 m. Rare and probably endangered.

Additional material examined: **PERU. Pasco:** Oxapampa, Dtto. Huancabamba, Santa Bárbara, 10°20'35"S, 75°39'0"W, 3400–3500 m, 25 Jan 2004 (bud, fl), *R. Vásquez et al.* 29084 (HOXA, HUT, MO, USM); 10°21'24.5"S, 75°39'27.4"W, 3450 m, 9–13 Jun 2006 (fl), *Luteyn et al.* 15659 (AAU, COL, CUZ, F, HUSA, MO, NY, USM), *Pedraza et al.* 1600 (COL, CUZ, F, HUSA, K, MO, NY, USM).

Siphonandra santa-barbarensis is characterized by its flat, marginally crenate, obscurely plinerved leaves with sharply mucronate tips, relatively long rachis, many-flowered inflorescences, articulate (sometimes inconspicuously) calyx, and staminal dehiscence by obliquely subterminal, elongate pores. The type was also found growing in the vicinity of *S. elliptica*.

EXCLUDED TAXA

Siphonandra mexicana Turcz. = *Rondeletia mexicana* (Turcz.) Standley [Rubiaceae].

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REFERENCES

- HOOKE, W.J. 1837. *Thibaudia elliptica*. Icones Pl. 2: pl. 108.
- KLOTZSCH, J.F. 1851. Studien über die natürliche Klasse Bicornes Linné. Linnaea 24:1–88.
- KRON, K.A., W.S. JUDD, P.F. STEVENS, D.M. CRAYN, A.A. ANDERBERG, P.A. GADEK, C.J. QUINN, J.L. LUTEYN, and R. FULLER. 2002a. Phylogenetic classification of Ericaceae: Molecular and morphological evidence. Bot. Rev. 68:335–424.
- KRON, K.A., E.A. POWELL, and J.L. LUTEYN. 2002b. Phylogenetic relationships within the blueberry tribe (Vaccinieae, Ericaceae) based on sequence data from *matK* and nuclear ribosomal ITS regions, with comments on the placement of *Satyria*. Amer. J. Bot. 89:327–336.
- LUTEYN, J.L. 1998. Neotropical blueberries: The plant family Ericaceae. <http://nybg.org/bsci/res/lut2>. [updated as Luteyn & Pedraza, 2006].
- LUTEYN, J.L. 2002a. Key to the species of Ericaceae of Bolivia, including two new species. Sida 20:1–20.
- LUTEYN, J.L. 2002b. Diversity, adaptation, and endemism in neotropical Ericaceae: Biogeographical patterns in the Vaccinieae. In: K. Young, C. Ulloa Ulloa, J.L. Luteyn, and S. Knapp, eds. Plant evolution and endemism in Andean South America. Bot. Rev. 68:55–87.
- RUIZ, H. and J. PAVÓN. 1802. Flora peruviana, et chilensis prodromus. Vol. 3. Madrid.
- SLEUMER, H.O. 1934. Ericaceae americanae novae vel minus cognitae. Notizbl. Bot. Gart. Berlin-Dahlem 12(112):119–140.
- SLEUMER, H.O. 1941. Vaccinioideen-Studien. Bot. Jahrb. Syst. 71:375–408.
- SMITH, A.C. 1932. The American species of Thibaudieae. Contr. U.S. Natl. Herb. 28(2):311–547.

NUMERICAL LIST OF TAXA

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|---|---|
| 1. <i>Siphonandra boliviana</i> Luteyn | 4. <i>Siphonandra nervosa</i> Luteyn & E.M. Ortiz |
| 2. <i>Siphonandra elliptica</i> (Ruiz & Pav. ex G. Don) Sleumer | 5. <i>Siphonandra santa-barbarensis</i> Luteyn & E.M. Ortiz |
| 3. <i>Siphonandra magnifica</i> Sleumer | |

LIST OF EXSICCATAE (*RECOGNIZED TYPE COLLECTION
NUMBERS IN BOLDFACE)

- | | |
|--|--|
| Aguilar, B. & Muriel, 1226 (2) | Huamantupa, I. & Huamantupa, 4440 (2) |
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